Psoriasis Exacerbation Following Dupilumab Use In A Nine-year-old Black Male Patient

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ABSTRACT

Distinguishing between psoriasis and other inflammatory dermatoses in pediatric skin of color can pose challenges. As more topical and systemic treatments become available for pediatric patients, early and accurate diagnoses are needed to help guide treatments for those that progress to severe disease. Delays in diagnosis for this population often lead to worsening disease until a correct diagnosis is reached. The goal of this article is to improve the understanding of inflammatory dermatoses in skin of color and review differential diagnoses, by presenting a case of psoriasis in a pediatric patient who flared after receiving dupilumab for an incorrect diagnosis of atopic dermatitis.

KEYWORDS: psoriasis, atopic dermatitis, dupilumab, secukinumab, skin of color, adverse drug events

INTRODUCTION

Distinguishing psoriasis from atopic dermatitis (AD) in skin of color (SOC) patients can be challenging. This is especially true in the acute phase, as erythema in SOC patients may appear violaceous or go unnoticed completely.1 Here, we present the case of a nine-year-old Black male clinically diagnosed with psoriasis after acute worsening of a skin eruption within days of starting dupilumab, and discuss unique clinical considerations for this population.

CASE PRESENTATION

A nine-year-old Black male patient presented with a widespread skin eruption (Figure 1 shows initial presentation before therapy), ongoing intermittently for years but rapidly worsening in the past four days after starting dupilumab prescribed at an outside facility. His medical history included autism spectrum disorder; there was no family history of atopy. Previous treatments included oral
cyclosporine for several weeks, which was discontinued due to elevated liver transaminases.

Physical examination showed several pink plaques with silvery scale and ill-defined hypopigmented patches on the scalp, and numerous scattered guttate patches and plaques on the face, elbows, and knees (Figure 2). The patient refused a skin biopsy due to needle phobia. No abnormalities were seen on complete blood count, metabolic panel, QuantiFERON gold, and hepatitis screening tests. Alanine aminotransferase was mildly elevated (39 U/L, nr 0-29 U/L).

Based on history and physical exam, the patient was diagnosed with psoriasis. He was started on secukinumab 150 mg weekly for five weeks, then 150 mg monthly thereafter. After two months of follow up, his status was markedly improved (Figure 3).

DISCUSSION

Diagnosing inflammatory dermatoses in SOC patients can be challenging, and knowledge gaps of SOC can delay appropriate treatment. Inflamed lesions that appear pink or red in lighter skin may be violaceous or hyperpigmented in SOC, making recognition of psoriasis, as one example, challenging. Psoriasis in Black patients can be more extensive in distribution and more commonly involves the scalp compared with lighter-skin cohorts, as seen in our patient.

Psoriasis can also be more challenging to diagnose in children due to atypical characteristics. Psoriatic lesions in children may be thinner, softer, less scaly, and sometimes less well-defined than in adults. As a result, pediatric psoriasis can be confused with atopic or nummular dermatitis, pityriasis rosea, or superficial fungal infections. Concomitant psoriasis and AD are occasionally encountered, and many children with psoriasis have a psoriasiform dermatitis that is an intermediate between psoriasis and dermatitis, often without the sharply delineated, very scaly lesions that are typical of psoriasis in adults. This condition is also referred to as overlap, eczematous psoriasis, or psoriasiform eczema. Given the guttate appearance of the lesions and the age of the patient, strep throat may have been considered a potential trigger but was not mentioned in the article.

The differential diagnosis of pediatric psoriasis may also include seborrheic dermatitis, scabies, and contact dermatitis. Rarer considerations include Netherton syndrome, primary immunodeficiency diseases, and acrodermatitis enteropathica. Diagnosing AD in
children with dark skin can pose a particular challenge given the varied clinical presentation of AD across skin types. AD may not be diagnosed or treated adequately in deeply pigmented children as erythema, a defining characteristic of AD, is more subtle in darker skin types. Additionally, children with darker skin types have a greater propensity for more papular presentation along with lichenification and dyschromia.

The current consensus criteria only lists pruritus, eczematous dermatitis, and a chronic or relapsing history as essential features. Other associated features of AD include keratosis pilaris, perifollicular accentuation in SOC, lichen simplex chronicus, and atypical vascular responses (i.e., facial palor, white dermatographism).

Dupilumab is a human monoclonal antibody targeting interleukin (IL)-4 and IL-13 receptors, approved by the United States Food and Drug Administration (FDA) for children with moderate to severe AD. Although the exact mechanism by which dupilumab triggers psoriasis in certain patients is not known, by blocking IL-4 signaling, dupilumab may release this inhibition, unveiling underlying psoriasis in a patient with unrecognized predisposition. It is believed to trigger psoriasis via suppression of the Th2 (AD) pathway in patients with AD, shifting the balance toward Th1/Th17 (psoriasis pathway) predominance.
and the development of psoriasis. The morphology of this patient’s eruption and acute worsening with dupilumab allowed for a clinical diagnosis, precluding need for a biopsy.

Biomarker research may help differentiate AD from psoriasis in SOC patients, identify novel therapeutic targets, and enable accurate prediction of phenotype-specific responses to targeted therapeutics. Previous studies have identified treatment-response biomarkers, which are important for understanding molecular tissue responses and their association with clinical severity. However, AD onset usually occurs in children who are younger than five years and biopsies are not always practical in children, and much less invasive blood phototyping cannot capture the complex AD skin phenotype. Minimally invasive approaches that accurately capture key immune and barrier biomarkers in the skin of patients with early-onset pediatric AD are needed. Most tape-studies have focused on adults with chronic AD. Two recent studies used proteomic immune assay to evaluate stratum corneum from non-lesional skin of infants with moderate AD compared to those without AD. Many cellular markers of T cells, AD-related dendritic cells, and key inflammatory innate, helper T cell 2 (TH2), and TH17/TH22 genes were significantly increased in lesional and nonlesional AD compared with tape strips from normal skin. The patient was seen at 1 and 2 months after starting secukinumab, with much of the inflamed plaques being resolved, leaving only post-inflammatory hyperpigmentation (Figure 3). Dupilumab reaches undetectable concentrations over 32 weeks; we expect to see continue improvement of the patient as these levels wane.

SOC can increase difficulty of making diagnosis between psoriasis and other eczematous inflammatory conditions. Further research of cytokine profiling where clinical diagnosis patterns may have some overlap could help to guide more specific diagnoses and more targeted treatments.

REFERENCES:


Patient consent: The patient gave written consent for publication of the de-identified information contained herein, including photographs, medical history, and clinical course.

Disclosures: Justin Love, MPAS, PA-C, is a speaker/consultant for Novartis, Sanofi/Regeneron, Abbvie, Leo Pharma, Acrutis, and Eli Lilly. Peter A Young, MPAS, PA-C, is a single-time committee advisor for Sanofi.

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Funding: No funding was provided.